

TABLE 3. Microbiological Contaminants Detected

Contaminant	MCL	MCLG	Date Sampled	Unit	Greatest Detected Level	Range	Major Sources	Violation
Total Coliform Bacteria	Present in not more than 5% of samples in a given month	0	None Detected	Present/ Absent	Absent	Not Applicable**	Naturally present in the environment	No
Turbidity	0.3 * TT	NE	daily	NTU	1.27	0.01 – 1.27	Soil runoff	No

\*Compliance based on at least 95% of all turbidity measurements in one month meeting the MCL. The lowest percent of samples meeting the MCL in any month of 2004 was 99%. \*\*The analytical method used does not enumerate total coliform bacteria that are present.

DISINFECTION BY PRODUCTS

TABLE 4. Total Trihalomethanes by Quarter

Site/Quarter	1st 2004	2nd 2004	3rd 2004	4th 2004	1st 2005	2nd 2005	3rd 2005	4th 2005
Range	34-50	42-90	53-84	20-38	12-36	56-122.3	52.2-71.2	31.6-44.9
Quarterly Average (MCL=80 ppb)	37.5	72.5	67.8	28.4	27.3	88.9	60.7	37.3
Rolling Annual Average	54.5	60.1	59.0	51.6	49.0	53.1	51.3	53.6

Required Additional Health Information - Disinfection by-products (DBPs) Information. DBPs form when naturally occurring organic matter in source waters reacts with disinfectants like chlorine. Disinfectants are still needed to kill harmful microorganisms, and chlorine remains one of the most effective and affordable disinfectants available. DBPs may be harmful. Research continues to identify potential adverse health effects. To reduce DBPs in Boulder's drinking water, treatment facility processes are being improved to reduce natural organic matter before the water is chlorinated.

TABLE 5. HAA5\* by Quarter (MCL = 60PPB)

Site/Quarter	1st 2004	2nd 2004	3rd 2004	4th 2004	1st 2005	2nd 2005	3rd 2005	4th 2005
Range	28-36	44-100	58-100	23-35	18-31	28-166	37-59.3	21.1-30.8
Quarterly Avg (MCL = 60 ppb)	33.1	78.0	74.6	26.8	23.4	107.1	46.3	26.0
Rolling Annual Average	48.3	55.5	59.8	53.1	51.0	58.1	50.9	50.7

\* For security reasons the City of Boulder no longer publishes monitoring locations.  
\*HAA5 is a suite of haloacetic acids including: dibromoacetic acid, dichloroacetic acid, monobromoacetic acid, monochloroacetic acid, and trichloroacetic acid. Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.

TABLE 6. Disinfectant

Constituent	Date Sampled	Unit	MRDL	Avg Detected Level	Range	Major Sources	Violation
Free or total Chlorine Residual	Throughout year	ppm	4	0.87	0.17-1.36	Disinfection of water in treatment against microbiological pathogens	No

TABLE 7. Unregulated Inorganic Contaminants Detected

Contaminant	MCL	MCLG	Date Sampled	Unit	Detected Level	Range	Major Sources	Violation
Sodium	NE	NE	8/9/04	ppm	8.2	1.5 -16.3	Erosion of natural deposits	No

Total Organic Carbon (TOC) Removal. EPA requires public water suppliers to reduce the risk of exposure to disinfection by-products such as trihalomethanes (THM) and haloacetic acids (HAA5) by removing some of the naturally occurring precursor compounds during treatment. Removal of those precursors is monitored by measuring TOC before and after treatment and computing a removal ratio.

TABLE 8. TOC Removal Ratio of TOC Removed\*

Range of ratio values throughout year	0.86 – 1.69
Ratio of TOC Removal as Running Annual Average of Quarterly Averages	1.38

\* The ratio of TOC removal is the percent of TOC removed divided by the required percent removal. A ratio > 1 indicates compliance with TOC removal requirements.

Glossary Definitions of terms in Tables 1-7

**AL (ACTION LEVEL)** - The concentration of a contaminant which if exceeded, triggers treatment or other requirements that a water system must follow.  
**MCL (MAXIMUM CONTAMINANT LEVEL)** - The highest level of a contaminant that is allowed in drinking water by state or federal regulations. MCLs are set as close to the MCLGs (see next definition) as feasible using the best available treatment technology.  
**MCLG (MAXIMUM CONTAMINANT LEVEL GOAL)** - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.  
**MRDL (MAXIMUM RESIDUAL DISINFECTANT LEVEL).**  
**NTU (Nephelometric Turbidity Unit)** - Used to describe the cloudiness of water.

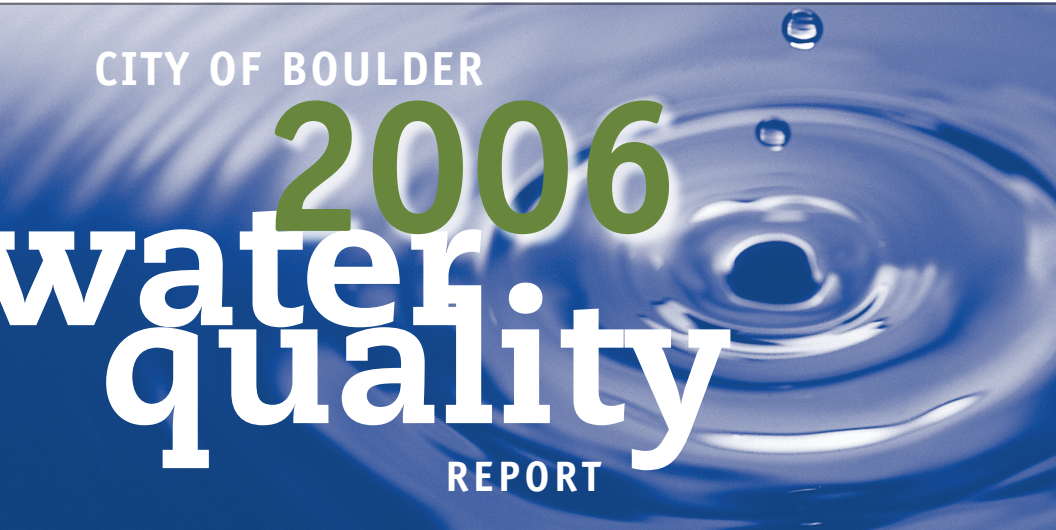
**pCi/l (PicoCuries Per Liter)** - A measure of radioactivity.  
**pH** - A measure of how acidic or basic water is reported in SU (see definition of SU, below).  
**ppb (Parts Per Billion)** - A measure of concentration of a constituent. Comparable to one penny in \$10,000,000.  
**ppm (Parts Per Million)** - A measure of concentration of a constituent. Comparable to one penny in \$10,000.  
**SU (Standard Units)** - Used to describe pH; pH can range from 1 SU (highly acidic) to 14 SU (highly basic) with 7.0 being neutral.  
**TT (Treatment Technique)** - A required process intended to reduce the level of a contaminant in drinking water.  
**NE (Not Established).**

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Boulder's Drinking Water

Our water comes from many sources – streams, lakes and reservoirs that are fed by snowmelt and rainfall. Some water is delivered from as far away as the Western Slope. Some water comes down from the Front Range mountains directly to our reservoirs and water treatment facilities. From our reservoirs, water is routed to either the Betasso Water Treatment Facility or the Boulder Reservoir Water Treatment Facility. Our main sources of water are Silver Lake and Lakewood Reservoir, Barker Reservoir, Boulder Reservoir and Boulder Feeder Canal, part of the Colorado Big Thompson project.



Why protect Boulder's source waters?

The Safe Drinking Water Act recognizes the importance of clean drinking water sources and mandates source-water protection as an essential barrier against



contaminants. The quality of streams, lakes and rivers is affected by nearby activities on land and water. Source-water contamination issues in Boulder's watersheds include urban runoff, recreational use and historic activities such as mining and land use changes.

FOR MORE INFORMATION CONTACT:  
Colorado Dept. of Public Health & Environment Water Quality Control Division 303-692-3500

Esta es informacion importante. Si no la pueden leer, necesitan que alguien se la traduzca.

Where does Boulder's drinking water come from?

BETASSO WATER TREATMENT FACILITY

Silver Lake, Lakewood and Barker water is used every year. Silver Lake Watershed collects water in several lakes, including Silver Lake. This water can be treated at the Betasso Water Treatment Facility.

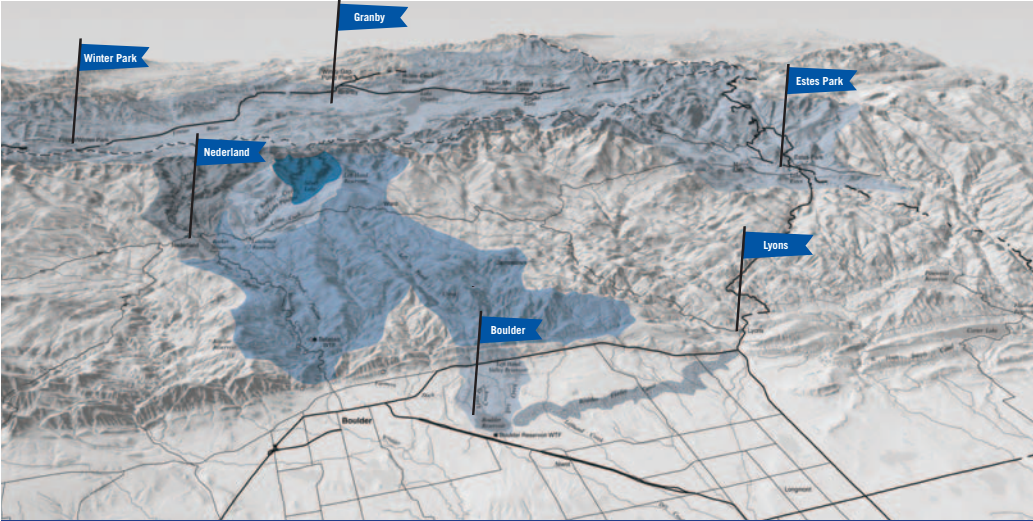
Lakewood Reservoir is supplied by North Boulder Creek, Como Creek and the Silver Lake Pipeline. Water from Lakewood Reservoir travels through the Lakewood Pipeline to the Betasso Water Treatment Facility.

Barker Reservoir receives water from Middle Boulder Creek and North Beaver Creek. Water from Barker Reservoir travels through the Barker Pipeline to Kossler Reservoir. This water enters a pipeline system leading to the Betasso Water Treatment Facility.

BOULDER RESERVOIR WATER TREATMENT FACILITY

As Boulder's water demand grows, the percentage of water delivered from Boulder Reservoir will increase to more than one-third of the total supply.

Boulder Reservoir receives most of its water from the Boulder Feeder Canal (BFC) but also receives water from two small western tributaries and Farmers Ditch. BFC is part of a canal and reservoir system that brings water from the western slope through the Colorado Big Thompson Project, which includes Carter Lake, to the Boulder Reservoir Water Treatment Facility. Farmers Ditch diverts water from Boulder Creek at the mouth of Boulder Canyon during the summer



Our Drinking Water Watersheds

irrigation season. Left Hand Creek is sometimes diverted into the BFC.

What's In It Before We Treat It?

All drinking water, including tap water and bottled water, originates in rivers, lakes, streams, ponds, reservoirs, springs and wells. Drinking water may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the drinking water poses a health risk.

Contaminants that may be present in source waters before they are treated include:

- Microbial contaminants, such as viruses, protozoans and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, human contact and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and herbicides, which may come from a variety of sources, such as agriculture, urban stormwater runoff and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and can also come from gas stations, urban stormwater runoff and septic systems.



• Radioactive contaminants, which can be naturally occurring or the result of oil and gas production and mining activities.

Contamination issues for Boulder water sources include runoff from land uses such as agricultural and livestock operations, industry and urban areas. An example of runoff contamination is lawn fertilizers, which can create both health and aesthetic problems within drinking water lakes and reservoirs. Contaminants from point sources such as urban storm drains can also contaminate drinking water supplies. Recreational uses, including swimming and motor boating, may also affect source water quality. Land use changes and increasing recreational demands in all of the watersheds can affect water quality.

In order to ensure that the tap water coming from these sources is safe to drink, the U.S. Environmental Protection Agency prescribes regulations which limit the amount of certain contaminants in water provided by Boulder and other public water systems. The city's treatment facilities reduce the contaminants in the source waters to levels that meet all state and federal requirements.

• Radioactive contaminants, which can be naturally occurring or the result of oil and gas production and mining activities.

**More Information about Contaminants and potential health effects can be obtained by calling the Environmental Protection Agency Safe Drinking Water Hotline at 1-800-426-4791 or online at: [www.epa.gov/safewater/index.html](http://www.epa.gov/safewater/index.html)**

**Source Water Assessment & Protection**  
*The Colorado Department of Public Health and Environment (CDPHE) has provided the city of Boulder with a Source Water Assessment Report for our water supplies. At this time, our Source Water Assessment Report is in the process of being edited. When it is finalized, it will be available by calling the contact listed below or accessing the Web site: [www.cdphe.state.co.us/wq/wqhom.asp](http://www.cdphe.state.co.us/wq/wqhom.asp)*

*Please contact Amy Struthers at 303-413-7400 to learn more about what you can do to help protect your drinking water sources.*

## THINGS YOU SHOULD KNOW

### What is in your drinking water?

The city's Drinking Water Program performed more than 14,000 tests on drinking water in 2005. This monitoring is done to ensure that the water delivered to your tap meets the standards set by the Environmental Protection Agency (EPA), the Colorado Department of Public Health and Environment (CDPHE) and our community.

Of the many impurities for which the city tested in 2005, few were detected in Boulder's tap water. Boulder's tap water met all federal drinking water standards in 2005.

Pesticides and herbicides, synthetic and volatile organics, radioactive contaminants and most harmful metals were not found in the treated water because they are not commonly found in our source waters. Other contaminants such as bacteria and other pathogens were not found in tap water because they were successfully removed by disinfection or reduced through properly adjusted treatment chemistry. For example, lead from home plumbing is reduced by the city's corrosion control treatment.

# How Is Water Treated?

**Treatment doesn't always remove all contaminants. The best solution is to keep pollution out of local water sources in the first place.**

## STEP 1 GETTING THE SOLIDS TO STICK TOGETHER

This is done by adding aluminum or iron salts plus chemicals called polymers to the water that make particles in the water stick together so they can more easily be separated out.

## STEP 2 MAKING "FLOC"

Particles are mixed together to make bigger masses of solids called 'floc' so that it can be easily separated for further division of water and particles.

## STEP 3 SEDIMENTATION

Water flows through a large tank which allows the "floc" to settle to the bottom of a large tank for removal.

## STEP 4 FILTERING

Water is passed through filters made of sand and anthracite coal to filter out remaining particles.

## STEP 5 ADDING THE STUFF THAT MAKES WATER DRINKABLE

1. Addition of chlorine to reduce risks from bacteria and disease-causing organisms and to maintain water quality through the distribution pipe system.
2. Addition of small amounts of lime or sodium hydroxide to make the water less corrosive to pipes.

## Step 6 DISTRIBUTION & TESTING

Before distribution, fluoride is also added. Water is then delivered to your tap through city pipelines. City staff collects and tests water samples for contaminants.

## More monitoring

### Variances and Exemptions from Standards

The city of Boulder does not operate under any regulatory variances or exemptions from meeting drinking water standards.

## Waived or Reduced Monitoring Requirements

*The Colorado Department of Health and Environment (CDPHE) is the primary agency responsible for enforcing the Safe Drinking Water Act and National Primary Drinking Water Regulations in Colorado. CDPHE is empowered to waive certain monitoring requirements when it finds that there would be no increased risk to health or safety. CDPHE has granted the city of Boulder as well as many other public water systems in Colorado, waivers from monitoring for several contaminants.*

## We Invite You

*Water Resources Advisory Board meetings are open to the public and are held the third Monday of each month, 7 p.m., at the Municipal Service Center located at 5050 East Pearl Street. For more information, call 303-441-3266 or check our Web site at [www.boulderutilities.net](http://www.boulderutilities.net). The city of Boulder Water Quality staff also participates in community and school events including Watershed Teacher Training, Children's Water Festival, Earth Day events, open houses and environmental celebrations. For more information about this report, call Amy Struthers, Drinking Water Program Supervisor, 303-413-7400.*

# Not In Our Water!

Cyanide is not monitored by the city of Boulder because no sources have been identified in Boulder's watershed areas. Asbestos is not monitored because natural deposits are scarce and were never mined and because the city of Boulder has very few asbestos-cement water mains remaining in its distribution system. Dioxin is not monitored in Colorado because records indicate that only very small amounts were ever shipped to Colorado and it was not widely used. Glyphosate is not monitored because it is broken down by chlorine during disinfection. Nitrite is not monitored because it has not been detected and even if present in trace amounts, is broken down by chlorine during disinfection. The city of Boulder is still required to monitor for nitrate.

CDPHE has granted the city of Boulder permission to perform reduced monitoring under the Lead and Copper in Drinking Water Rule (LCR) on the basis of the city's ability to improve corrosion control and reduce the amount of lead and copper leached from domestic plumbing systems. The city of Boulder continues to monitor its corrosion control processes and will monitor for lead and copper.

## HEALTH & WATER QUALITY

### Lead Information

Boulder's treated water is virtually lead free. Any lead found in tap water is most commonly a result of leaching from lead solder found in some home plumbing. The city of Boulder implemented corrosion control treatment in 1993, which has significantly reduced tap water lead levels at most locations. Some residences may still show measurable lead levels. The city is currently evaluating additional corrosion control measures to further reduce tap water lead levels. Infants and young children are typically more vulnerable to lead in drinking water than the general population. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested. In the meantime, flushing your tap for 30 seconds to two minutes before using tap water removes any trace amounts of lead. You can collect this water and use it for other uses, such as watering plants or gardens or cleaning around your home.

## Pathogen Information

Testing in 2005 did not show any pathogens in the tap water. The city of Boulder conducts more monitoring than is required by regulations. One of the contaminants tested is the pathogen Cryptosporidium, which has caused outbreaks of intestinal

disease in the U.S. and overseas. Ingestion of Cryptosporidium may cause Cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water. Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. and is very hard to kill. Even a well-run water system may contain some live parasites. The EPA is working to resolve several scientific issues that will allow it to set Cryptosporidium safety standards.

City monitoring indicates the presence of these organisms in our source waters. Testing in 2005 did not show any pathogens in the tap water.

Although most healthy individuals can overcome the disease within a few weeks, some individuals may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised people, such as those undergoing chemotherapy, those who have undergone organ transplants, those with HIV/AIDS or other immune system disorders, as well as some elderly persons and infants are at greater risk of developing life-threatening illness. Immuno-compromised individuals should seek advice from their health care providers. For more information about contaminants and potential health effects, or to receive a copy of the U.S. EPA and Centers For Disease Control guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and microbiological contaminants, call the EPA Safe Drinking Water Hotline: 800-426-4791.

## TEST, TEST, TEST... AND THE RESULTS



CDPHE prescribes regulations limiting the amount of certain contaminants in water provided by public water systems to ensure that the tap water is safe to drink. The required testing frequency varies per contaminant. The information contained in the tables reflects the most current data.

Contaminants detected at measurable levels include disinfection by-products, turbidity (suspended particles) and lead. None of these exceeded regulatory standards but they did reach elevated levels during some periods. As part of a continuous improvement program, the city has set internal goals for further reduction of these contaminants.

THE FOLLOWING TABLES show the 2005 test results for substances that were detected in Boulder's drinking water and have specific limits set by EPA or CDPHE regulations. Possible sources of the substances are noted in the last column of the table. Definitions of terms and abbreviations used are listed following the tables. In some cases our data, though representative, is more than one year old (e.g., for organic contaminants).

TABLE 1: Inorganic Contaminants Detected									
Contaminant Sampled	Date Level	AVG Detected	Range	Unit	MCL	MCLG	Violation	Major Sources	
Barium	11/29/05	0.022	0.008-0.036	ppm	2.0	2.0	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.	
Copper (at selected household taps) (b)	Aug-Sept 2005	0.190 (a)	0.022-0.370	ppm	AL=1.3 (c)	1.3	No	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives.	
Fluoride	daily	0.90	0.22-1.09	ppm	4	4	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.	
Lead (sampled at selected household taps) (b)	Aug-Sept 2005	2.8 (a)	0-2.0 (d)	ppb	AL=15 (c)	0	No	Corrosion of household plumbing systems; Erosion of natural deposits.	
Selenium	11/29/05	1.5	0-2.0	ppb	50	50	No	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.	

(a) 90th percentile value of 54 samples. (b) City of Boulder qualified on the basis of reduced lead and copper values and corrosion control performance for reduced monitoring every three years. (c) AL is the Action Level under Lead and Copper Rule, not an MCL.(d) Three of 54 sites monitored exceeded the 15 ppb for lead. The home owners of the three sites were notified. Overall the city is below the Action Level for lead. (e) MCL (f) MCLG

TABLE 2: Organic Contaminants Detected								
Contaminant	Date Sampled	Unit	MCL	MCLG	Detected Level	Range	Major Sources	Violation
Hexachloro-cyclopenta-diene	5/12/2003	Ppb	50	50	0.06	0-0.06	Discharge from chemical factories.	No

## What you should know about bottled water

Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water. As noted previously in this report, all drinking water, including bottled water, comes from sources that may contain at least small amounts of some contaminants. The FDA limits are intended to provide consumers of bottled water with the same protection for public health as other sources of drinking water. However, the regulations and testing requirements for contaminants in bottled water are much less stringent than for tap water.

More information about bottled water, possible contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791. Another source of information is the Natural Resources Defense Council, which has performed extensive testing on many brands of bottled water. The results of those tests are available online at: <http://www.nrdc.org/water/drinking/nbw.asp>

